

ABSTRACT

A new technique incorporates a 1/4-rate Hard Disk Drive (HDD) servo-data encoding into a Partial Response Maximum Likelihood (PRML) read channel. The limitation of the HDD servo-track writer is the maximum frequency associated with writing the servo data while maintaining a level of data alignment between the data in the adjacent tracks (coherency). The 1/4 code allows the servo data to be written at the maximum coherency bandwidth. Specifically, the data is read back (or sampled) at twice the write frequency. This increases the data redundancy while also increasing the data density and the disk storage capacity. The 1/4 coding can also be applied to conventional HDD dibit coding. Specifically, the 1/4-coding scheme reads each dibit-coded servo-data transition 01 as 0011, and reads each non-transition 00 (or 0) as 0000. The 1/4 coding and its matched Viterbi detector can also increase the data detection in comparison to conventional peak-detection schemes. And although the 1/4 coding scheme is described in conjunction with a PR4-type servo channel, it can also be used with an EPR4-type servo channel and other types of servo channels.